We Claim:

1. An implantable medical device communication system, comprising:
an implantable medical device comprising a power supply, a controller, and a communication unit, wherein the communication unit combines data from the controller and power from the power supply to produce a communication signal that is selectively changeable between at least a first and a second voltage, produces a reference voltage, and generates voltage power pulses from the power supply;

a two-wire bus to receive the communication signal and the voltage power pulses on a first wire, and to receive the reference voltage on a second wire; and

a slave device comprising a recovery unit to recover power from the voltage power pulses and a transceiver unit to decode data from the selectively changeable communication signal transmitted across the first wire,

wherein one bit time of data to be communicated across the first wire is defined as a predetermined number of clock cycles, a logic "0" is communicated by holding the first wire at the first voltage for a first fraction of the predetermined number of clock cycles, and a logic "1" is communicated by holding the first wire at the first voltage for a second fraction of the predetermined number of clock cycles, and

wherein the second voltage is substantially equal to the reference voltage.

2. The implantable medical device communication system of claim 1, wherein the voltage power pulses comprise bipolar voltage power pulse pairs.

3. The implantable medical device communication system of claim 2, wherein the pulses of each bipolar voltage power pulse pair are separated by an interval, and a duration of the interval and of each of the pulses of each bipolar power pulse pair is substantially equal to one bit time.

4. The implantable medical device communication system of claim 1, wherein the slave device enters a power down state, detects one of the voltage power pulses, and exits the power down state based on detection of the voltage power pulse.

5. The implantable medical device communication system of claim 1, wherein the slave device detects at least one of the voltage power pulses, and performs a predetermined action based on detection of the voltage power pulse.

6. The implantable medical device communication system of claim 5,

wherein the communication unit of the implantable medical device uses a sequence of voltage power pulses to address the slave device, and

wherein the slave device detects the sequence of voltage power pulses and performs the predetermined action based on detection of the sequence.

7. The implantable medical device communication system of claim 6, wherein the predetermined action comprises at least one of a measurement and delivery of a therapy.

8. The implantable medical device communication system of claim 1, wherein the communication unit of the implantable medical device outputs commands to the slave device.

9. The implantable medical device communication system of claim 8,

wherein the communication unit of the implantable medical device outputs a start sequence subsequent to generation of one of the voltage power pulses, and outputs one of the commands subsequent to generation of the start sequence, and

wherein the transceiver unit of the slave device detects the voltage power pulse and monitors for the start sequence based on the detection.

10. The implantable medical device communication system of claim 9, wherein the transceiver unit of the slave device identifies a polarity of the voltage power pulse, and identifies a polarity of the first voltage for receipt of the start sequence and command based on the polarity of the voltage power pulse.

11. The implantable medical device communication system of claim 9, wherein the start sequence comprises three bit times, a first bit time of the start sequence comprises a forced "0" that is communicated by holding the first wire at the second voltage for substantially the entire first bit time, and each of a second bit time and third bit time of the start sequence comprise a logic "1".

12. The implantable medical device communication system of claim 9, wherein the communication unit outputs a plurality of commands to the slave device between consecutive voltage power pulses, and outputs a start sequence to precede each command.

13. The implantable medical device communication system of claim 9, wherein the transceiver unit of the slave device indicates a power status of the slave device to the implantable medical device during a bit time of a stop sequence that follows the command.

14. The implantable medical device communication system of claim 13, wherein the communication unit of the implantable medical device receives the indication of the power status from the transceiver unit of the slave device by driving the first wire of the bus at the first voltage, and then sensing the first wire to determine a fraction of the bit time at which the transceiver unit pulls the first wire to the second voltage.

15. The implantable medical device communication system of claim 14,

wherein the transceiver unit of the slave device communicates a low power status by pulling the first wire to the second voltage at a first fraction of the bit time, and communicates an adequate power status by one of pulling the first wire to the second voltage at a second fraction of the bit time and allowing the first wire to remain substantially at the first voltage through the first and second fractions of the bit time.

16. The implantable medical device of claim 14, wherein the communication unit of the implantable medical device weakly holds the bus at the first voltage while sensing the first wire to determine a slave fraction of the bit time at which the transceiver unit pulls the first wire to the second voltage.

17. The implantable medical device communication system of claim 1, wherein the slave device comprises at least one of a sensor and an actuator that is external to the implantable medical device.

18. The implantable medical device communication system of claim 1, further comprising a plurality of slave devices, each slave device comprising a sonomicrometry transducer, wherein the communication unit of the implantable medical device directs at least one of the slave devices to act as a transmitter for a measurement and directs at least one of the slave devices to act as a receiver for the measurement.

19. The implantable medical device communication system of claim 1, wherein the implantable medical device comprises a first implantable medical device and the slave device comprises a second implantable medical device.

20. An implantable medical device communication system, comprising:

an implantable medical device comprising a power supply, a controller, and a communication unit, wherein the communication unit selectively outputs voltage power pulses and a plurality of different commands, each command preceded by a start sequence and followed by a stop sequence;

a bus to transmit the voltage power pulses and communicate the start sequences, stop sequences and the plurality of different commands; and

a slave device comprising a recovery unit to recover power from the voltage power pulses and a transceiver unit to receive the commands via the bus, wherein the transceiver unit indicates a power status of the slave device during the stop sequences.

21. The implantable medical device communication system of claim 20, wherein the stop sequence includes a plurality of bit times, and the transceiver unit indicates a low power status of the slave device by communicating a logic "0" during one of the bit times to, and indicates an adequate power status of the slave device by one of communicating a logic "1" during the bit time and not responding during the bit time.

22. The implantable medical device communication system of claim 20, wherein the voltage power pulses comprise bipolar voltage power pulse pairs.

23. The implantable medical device communication system of claim 20, wherein the slave device enters a power down state, detects one of the voltage power pulses, and exits the power down state based on detection of the voltage power pulse.

24. The implantable medical device communication system of claim 20, wherein the slave device detects at least one of the voltage power pulses, and performs a predetermined action based on detection of the voltage power pulse.

25. The implantable medical device of claim 24,

wherein the communication unit of the implantable medical device uses a sequence of voltage power pulses to address the slave device, and

wherein the slave device detects the sequence of voltage power pulses and performs the predetermined action based on detection of the sequence.

26. The implantable medical device communication system of claim 20, wherein the communication unit outputs a plurality of commands to the slave device between consecutive voltage power pulses, and outputs a start sequence to precede each command.

27. The implantable medical device communication system of claim 20, wherein the communication unit outputs a plurality of voltage power pulses between consecutive commands.

28. The implantable medical device communication system of claim 20, wherein the slave device comprises a sensor that is external to the implantable medical device.

29. An implantable medical device communication system, comprising:

an implantable medical device comprising a power supply, a controller, and a communication unit, wherein the communication unit selectively outputs voltage power pulses and a plurality of different commands, and outputs a plurality of commands between consecutive voltage power pulses;

a bus to transmit the voltage power pulses and communicate the plurality of different commands; and

a slave device comprising a recovery unit to recover power from the voltage power pulses and a transceiver unit to receive the commands via the bus.

30. The implantable medical device communication system of claim 29, herein the communication unit outputs a start sequence to precede each command.

31. The implantable medical device communication system of claim 30, wherein the start sequence comprises three bit times, a first bit time of the start sequence comprises a forced "0", and each of a second bit time and

third bit time of the start sequence comprise a logic "1".

32. The implantable medical device communication system of claim 29, wherein the communication unit outputs a plurality of voltage power pulses between consecutive commands.